

WHAT IS CLAIMED IS:

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1. A clock adjusting device for use with a data reproducing apparatus for a reproduction signal from a recording medium is sampled synchronizing with a predetermined clock and data is restored in accordance with a maximum-likelihood decode algorithm corresponding to a record rule of a partial response using a sample value, said clock adjusting device comprising:

10 a phase error detecting part detecting a phase error amount of a clock based on a state of said sample value at a first edge of said reproduction signal on a basis of a reference level;

an offset detecting part detecting an offset amount of said reproduction signal;

20 a reference level adjusting part adjusting said reference level used by said phase error amount detecting part based on said offset amount detected by said offset detecting part; and

25 a phase adjusting part adjusting a phase of said clock based on said phase error amount detected by said phase error detecting part,

wherein said offset detecting part comprises:

30 a monitor sample value generating part generating a monitor edge sample value based on said sample value at a second edge being an opposite side edge to said first edge of said reproduction signal; and

35 an offset calculating part for calculating, as an offset amount, a change amount of said monitor edge sample value generated by said monitor sample value generating part based on said monitor edge

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sample value obtained at a predetermined timing.

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2. The clock adjusting device as claimed in claim 1, wherein said first edge is a leading edge of said reproduction signal, and said second edge is a trailing edge of said reproduction signal.

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3. The clock adjusting device as claimed in claim 2, comprising an offset adjusting part adjusting an offset amount obtained by said offset calculating part,

wherein said reference level adjusting part adjusts said reference level used by said phase error amount detecting part based on said offset amount adjusted by said offset adjusting part.

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4. The clock adjusting device as claimed in claim 1, comprising:

a part detecting said phase error amount based on said change state of a plurality of sample values; and

a phase error switching control part controlling said phase adjusting part so that said phase of said clock is adjusted based on said phase error amount obtained by said phase error detecting part after said phase of said clock is adjusted based on said phase error amount detected by said part.

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5. An offset detecting device for  
5 detecting an offset of a reproduction signal in a  
data reproducing apparatus that said reproduction  
signal from a recording medium is sampled  
synchronizing with a predetermined clock and data is  
restored using a sample value in accordance with a  
10 maximum-likelihood decode algorithm corresponding to  
a record rule of a partial response, said offset  
detecting device comprising:

15 a monitor sample value generating part for  
generating a monitor edge sample value based on said  
sample value at a second edge being an opposite side  
edge of a first edge of said reproduction signal when  
said reproduction signal is sampled synchronizing  
with said clock which phase is adjusted to said first  
edge of said reproduction signal; and

20 an offset calculating part calculating, as  
an offset amount of a reproduction signal, a change  
amount of said monitor edge sample value generated by  
said sample value generating part on a basis of said  
monitor edge sample value obtained at a predetermined  
25 timing.

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6. The offset detecting device as claimed  
in claim 5, wherein said monitor sample value  
generating part comprises an averaging part averaging  
a plurality of sample values at said second edge and  
35 generating said monitor edge sample value.

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7. The offset detecting device as claimed  
in claim 5, wherein said monitor edge sample value  
5 generating part comprises a sample value selecting  
part selecting two sample values that are used to  
generate said monitor edge sample value when said two  
sample values are continuously obtained as a sample  
value at said second edge.

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8. The offset detecting device as claimed  
15 in claim 7, wherein said sample value selecting part  
selects one of said two sample values, in which a  
change of said monitor edge sample value becomes  
smaller, to be used to generate said monitor sample  
value.

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9. The offset detecting device as claimed  
25 in claim 7, wherein said sample value selecting part  
selects one of said two sample values, which is  
obtained at an earlier timing, to be used to generate  
said monitor sample value.

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10. The offset detecting device as  
claimed in claim 7, wherein said sample value  
35 selecting part selects one of said two sample values,  
which is obtained at a later timing, to be used to  
generate said monitor sample value.

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5                    11. An apparatus for reproducing data,  
comprising:

                  a first processing part sampling a  
reproduction signal synchronizing with a first clock  
which phase is adjusted to a first edge of said  
10 reproduction signal from a recording medium, and  
restoring data in accordance with a maximum-  
likelihood decode algorithm corresponding to a record  
rule of a partial response by using a first sample  
value; and

15                    a second processing part sampling said  
reproduction signal synchronizing with a second clock  
which phase is adjusted to a second edge being an  
opposite side edge of said first edge of said  
reproduction signal, and restoring data in accordance  
20 with said maximum-likelihood decode algorithm by  
using a second sample value,

                  wherein said first processing part  
comprises:

                  a monitor sample value generating part  
25 generating a monitor edge sample value based on said  
second sample value at said second edge of said  
reproduction signal;

                  an offset calculating part calculating, as  
an offset amount, a change amount of said monitor  
30 edge sample value generated by said sample value  
generating part based on said monitor edge sample  
value obtained at a predetermined timing; and

                  a part supplying said offset amount  
obtained by said offset calculating part to said  
35 second processing part,

                  so that said first processing part and  
said second processing part restore data based on

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said reproduction signal and said offset amount.

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12. The apparatus as claimed in claim 11,  
wherein each of said first processing part and said  
second processing part comprises an offset adjusting  
part adjusting said first sample value or said second  
10 sample value based on said offset amount.

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13. The apparatus as claimed in claim 12,  
wherein each of said first processing part and said  
second processing part comprises a phase error  
detecting part detecting a phase error amount of said  
first clock or said second clock for sampling said  
20 reproduction signal based on said offset amount, and  
adjusts an phase of said first clock or said second  
clock based on said phase error amount by said phase  
error detecting part.

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